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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/133,989	08/14/1998	TRUNG T DOAN	93-0421.03	7303

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CHARLES B BRANTLEY II
8000 S FEDERAL WAY
M S 525
BOISE, ID 837169632

EXAMINER

EDWARDS, LAURA ESTELLE

ART UNIT PAPER NUMBER

1734

DATE MAILED: 02/13/2003

23

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/133,989

Applicant(s)

DOAN, TRUNG T

Examiner

Laura E. Edwards

Art Unit

1734

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 December 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 12-33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 12-33 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 22.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

Art Unit: 1734

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 102

Claims 14, 22-29, and 31-33 are rejected under 35 U.S.C. 102(b) as being anticipated by Honda (JP 8-5825) with Fisch (US 4,314,022) cited to show inherency.

Honda teaches a bead remover for a rectangular shaped wafer comprising a negative pressure or vacuum mechanism spaced from a bead on the wafer while operating on the bead and a dispensing mechanism aligned with the negative pressure mechanism wherein the dispensing mechanism delivers chemical or a developer solution that removes the bead. Honda does not explicitly recite that the developer is a solvent for the resist, however, this feature is inherent as a developer can act by dissolving a photoresist layer as evidenced by Fisch (see claim 5). Therefore, inherently, the Honda developer solution would be a solvent for the edge bead.

With respect to the use of a solvent nozzle above and below the wafer as well as the use of a vacuum mechanism above and below the wafer, Honda recognizes the use of developer solution nozzles above and below the wafer as well as the vacuum mechanism encompassing or surrounding the nozzles. The Honda apparatus is deemed spaced from the substrate as the substrate is given adequate space to enter into the apparatus via a slot (not numbered) as shown in Fig. 3.

Claim 28 is rejected under 35 U.S.C. 102(b) as being anticipated by Isono (JP-2-157763).

Isono teaches a chemical remover for a substrate comprising a nozzle (4) directed toward the substrate while the substrate is processed and moved and the nozzle being coupled to a

Art Unit: 1734

source of chemical or solvent (10) to dissolve material on the substrate and a vacuum device or conduit (6) spaced from the material and directed toward the nozzle during processing.

Claim Rejections - 35 USC § 103

Claims 12, 13, and 17-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kottman et al (US 4,685,975) in view of Honda (JP 8-5825).

Kottman et al teach an apparatus for removing the edge bead from a coated wafer while it is spinning comprising a spinning chuck (24) having the wafer (26) thereon and at least one solvent dispensing mechanism (46, 55) for dispensing a solvent onto the wafer to remove an edge bead of coating material. Kottman et al do not teach or suggest the use of a suction mechanism offset from the wafer in combination with the solvent nozzle to remove the edge bead while the wafer is spinning. However, it was known in the art at the time the invention was made, to use a suction mechanism surrounding but spaced from the wafer in combination with at least one liquid dispensing nozzle to facilitate removal of the edge bead and excess photoresist material from the edge of a wafer as evidenced by Honda (see abstract). It would have been obvious to one of ordinary skill in the art to provide a suction mechanism as taught by Honda surrounding the solvent nozzle of Kottman et al in order to facilitate removal of excess materials from the edge of a wafer.

With respect to the use of a solvent dispenser above and below the wafer, Kottman shows the solvent dispenser below the wafer in Fig. 1 but teaches that the dispenser can also be above the wafer (see col. 5, lines 62-65). Therefore, it would have been obvious to one of ordinary skill in the art to provide solvent nozzles above and below the wafer in the apparatus defined by the

Art Unit: 1734

combination above in order to effectively remove the edge bead material from the periphery of the wafer.

With respect to each solvent dispensing nozzle being perpendicular to the wafer, Honda recognizes the dispensing nozzle being perpendicular to the wafer such that one of ordinary skill in the art would have found it obvious as an engineering design choice to make each solvent nozzle perpendicular to the wafer.

Claims 14, 15, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uchida et al (JP 56-73579) in view of Honda (JP 8-5825).

Uchida et al teach an apparatus for removing coating from the edge of a coated substrate comprising a negative pressure mechanism configured to operate on a thick film part or bead and a dispensing mechanism aligned and concentric with the negative pressure mechanism to apply solvent or water to remove the bead (See Fig. 1). Uchida et al show in Fig. 3, the tip of the apparatus contacting the edge bead but also refer to a gap of 180 μ between suction port (2) tip and the substance to be coated (see the example on the last page of the translation). Uchida et al do not illustrate the apparatus being positioned or configured above the thick film part. However, it was known in the art, at the time the invention was made, to configure an edge bead removal apparatus including a solvent dispenser and vacuum mechanism, out of contact with the wafer having an edge bead thereon as evidence by Honda (see Fig. 3). In view of the conventional edge bead removal apparatus as taught by Honda, it would have been obvious to one of ordinary skill in the art to space the Uchida et al apparatus a predetermined distance from the coated substrate in order to prevent wear and tear to the apparatus tip and eliminate excess

Art Unit: 1734

cleaning of the tip. Furthermore, it is deemed to be within the level of ordinary skill in the art to position or configure the Uchida et al apparatus an appropriate distance from the surface of the substrate to remove one or plural layers of coating material from the edge of the substrate.

Response to Arguments

Applicant's arguments filed 12/9/02 have been fully considered but they are not persuasive.

Applicant contends that the Honda developer, which is taught to permeate the built-up of the periphery of a resist coated substrate and thereby remove the built-up part (see abstract), is not a solvent and therefore the Fisch teaching of a developer that can dissolve a photoresist, can not be used to support inherency because both references are contradictory in teaching. This argument is not deemed persuasive because the teachings of Honda do not contradict the teaching of Fisch because both recognize a developer being applied to a photoresist coating on a substrate. Fisch elaborates more than the Japanese translation of Honda to suggest that a developer can dissolve a photoresist coating and therefore the Honda developer can be construed to act as a solvent even though Honda does not explicitly state that fact. There is no foreseen contradiction such that the inherency teaching to Fisch is proper.

Applicant contends that the prior art to Heller (US 5,178,989) suggests that resist developer is not necessarily a solvent (see col. 9, lines 34-46 and col. 17, lines 34-37) and therefore there is inadequate support in the record to suggest that Honda's developer is inherently a solvent. This argument is not deemed persuasive primarily because no rejection has been made with the application of the teachings of Heller. Secondly, Applicant's citing of the Heller

Art Unit: 1734

reference has merely provided more evidence that there are a multitude of developer compositions for application to a resist coating. The developer composition used is dependent upon what chemical characteristics the user wants to apply to the resist coating and/or developing process. The Examiner will note however that Heller does suggest that the chemistry involved with the developer composition affects its degree of solubility in the resist (see col. 9, lines 36-41) such that inherently, the developer with a desired chemistry can have some degree of solubility in the resist coating. Regardless, the Heller reference is seen merely as background art.

Applicant contends that Isono does not anticipate the claimed invention because Isono teaches a vacuum device that is contacts its workpiece and the claimed invention requires that the vacuum device does not contact the workpiece. This argument is not deemed persuasive because the vacuum device or suction conduit (6) is distanced away from the substrate such that the reference to Isono anticipates the claimed invention.

Applicant contends that the combination of Kottman and Honda is improper because the main purpose [intended use] of the Kottman apparatus is cleaning and that conflicts with the main purpose [intended use] of the Honda apparatus, which is developing. This argument is not deemed persuasive because Applicant is arguing intended use with respect to structural limitations set forth in apparatus claims. The intended use of Kottman as well as the intended use of Honda is to remove edge build-up or the edge bead from the periphery of a resist coated substrate. There is no contradiction in the purpose of Kottman or Honda.

Applicant contends that how Kottman treats the substrate is different from that of how Honda treats the substrate such that one of ordinary skill in the art would not modify Kottoman

Art Unit: 1734

to include a suction mechanism as taught by Honda. This argument is not deemed persuasive as Applicant has argued and compared wafer-handling techniques of Honda to that of Kottman. Regardless of how Kottman and Honda handle the wafer, the structural incorporation of a vacuum mechanism as disclosed by Honda about the solvent dispensing nozzle treatment of Kottman would enhance removal of excess coating material, solvent, and/or solvent vapor given off by the treated substrate. The incorporation of the Honda vacuum about the Kottman solvent nozzle would not physically destroy or defeat the main objective of Kottman to provide for a uniformly resist coated substrate without the undesirable edge bead.

Applicant cites prior art to Allen (US 4,518,678) and Milina (US 5,444,921) to support the contention that the routineer in the art would not modify Kottman's apparatus to include a vacuum because Kottman uses centrifugal force to remove the excess solvent from the coated substrate. This argument is deemed moot because Applicant has merely cited more patents directed toward edge bead removal and none are a part of the cited rejections. The absence of the enhanced feature of vacuum or suction about a solvent dispenser relative to the wafer edge bead in the cited prior art does not negate the obviousness of use of a vacuum device as taught by Honda with the Kottman solvent dispenser to remove excess resist coating, solvent and/or solvent vapor. The cited prior art does not cast a negative shadow over modification of the Kottman reference to include a vacuum device.

Applicant contends that the nozzle configuration and orientation of Kottman and Honda conflict. This argument is not deemed persuasive because the modification of the Kottman apparatus to include a vacuum or suction device in the vicinity of the solvent nozzle dispenser

Art Unit: 1734

and the edge of the coated substrate would not physically destroy the structure to Kottman regardless of the Kottman nozzle configuration or orientation.

Applicant contends that the combination of Uchida with Honda is improper and should be withdrawn because of flaws in the Examiner's reasoning in terms of characterization of Uchida, the Examiner's belief concerning conventions in the art, the Examiner's motives for the combination, the Examiner's announcement concerning the level of ordinary skill in the art, and the conflicting teachings of Uchida and Honda. These arguments are not deemed persuasive for reasons already set forth in the response to arguments in Paper No. 17, pages 5-7. Furthermore, the Uchida and Honda references do not conflict and are structurally combinable as set forth in the rejection above. There would be no physical destruction to the Uchida nozzle in incorporating the vacuum device of Honda and positioning of the combined device relative to a coated substrate.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

Art Unit: 1734

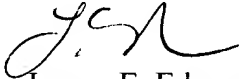
however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Laura E. Edwards whose telephone number is (703) 308-4252.

The examiner can normally be reached on M-Thursday with alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Crispino can be reached on (703) 308-3853. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-7115 for regular communications and Same as above for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.


Laura E. Edwards
Primary Examiner
Art Unit 1734

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February 12, 2003